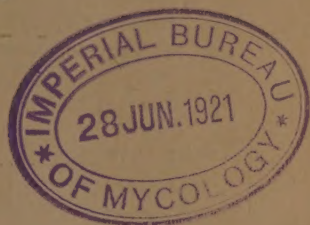


WEST VIRGINIA
STATE CROP PEST COMMISSION
MORGANTOWN, W. VA.

BULLETIN No. 2

VOL. 1, No. 2



Orchard Inspection
'Apple Rust' by D. H. S. Giddings.
Chestnut Bark Disease
by A. B. Brooks.



MORGANTOWN, WEST VIRGINIA
SEPTEMBER, 1913

WEST VIRGINIA STATE CROP PEST COMMISSION.

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State Entomologist.



WEST VIRGINIA STATE CROP PEST COMMISSION.

Bulletin published quarterly at Morgantown.

W. E. RUMSEY, State Entomologist.

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INSPECTION OF ORCHARDS AND OTHER PREMISES.

In order to carry out certain provisions of Chapter 14, Acts of the West Virginia Legislature of 1913, known as the State Crop Pest Law, local inspectors have been placed in counties from which petitions, signed by ten freeholders, have been received by the State Crop Pest Commission asking for such work. As a rule these petitions have come from the principal fruit growing sections of the state, or from those counties in which this industry is now developing.

The men appointed for this work are all of mature years, selected with care and each assigned to the territory where his natural ability and training would be best suited for the work in that particular section. While the inspection work is similar in the main, the prevalence of some relatively new plant diseases in certain localities requires special attention, and a man to do the work who has, besides his training, ability and natural aptitude to overcome the prejudices and unbelief of the people concerning the life history and destructive effect of such diseases. These points, together with the most practical methods of control, must be made so plain to the uninformed that not only will such parties become interested in the subject under consideration but also see that by their assistance in fighting these troubles the community, the county, and the state will be benefitted.

During the past summer eighteen inspectors were appointed by the Crop Pest Commission and placed in the field. Thirteen of these are orchard inspectors and the other five are employed in the chestnut blight investigation.

Orchard Inspectors.

Name	Home address	Territory assigned
Edward Behrens	Sherrard, W. Va.	Brooke & Hancock Co.
H. L. Crane	Morgantown, W. Va.	Harrison & Upshur Co.
P. W. Dayton	Pinto, Md.	Mineral County
R. H. Gist	Wellsburg, W. Va.	Marshall County
T. F. Hansbarger	Peterstown, W. Va.	Morgan County
Percy C. Manley	Monongah, W. Va.	Jefferson County
R. W. Muldoon	Morgantown, W. Va.	Wetzel County
A. K. Perry	Junior, W. Va.	Berkeley County
L. E. Reynolds	Grape Island, W. Va.	Wood County
E. Lowry Scott	Grandview, W. Va.	Raleigh County
D. E. Swisher	South Branch, W. Va.	Grant & Hardy Co.
E. A. Tuckwiller	Lewisburg, W. Va.	Preston County
L. H. Wolford	Fordhill, W. Va.	Hampshire County

Chestnut Blight Inspectors.

C. L. Brooks	Buckhannon, W. Va.	Eastern part of State
J. Wesley Sittler	Martinsburg, W. Va.	Eastern part of State
C. J. DeHaven	Martinsburg, W. Va.	Eastern part of State
C. G. DeHaven	Glengary, W. Va.	Eastern part of State
E. W. Miller	Gerrardstown, W. Va.	Eastern part of State

Policy of the Commission Concerning Inspection Work.

Education and co-operation are the best and surest methods by which the state or nation can assist its people in checking the ravages of dangerously injurious insects and diseases. First the people must be convinced that certain insects or diseases are injuring or destroying their domestic animals, farm crops or orchards, and this can be done in no other way except by education. Having accomplished this end co-operation of a majority of the rural population is assured. This policy of carrying on inspection work has proved the most effective method adopted by the state, years ago, in its fight against the San Jose scale.

Apple Rust and Chestnut Blight.

In the eastern part of the state, particularly in Berkeley and Jefferson counties, a disease of apple trees, commonly known as apple rust or "cedar rust" has recently become exceedingly prevalent owing to the great number of certain commercial varieties being planted and the abundance of the common red cedar in this section. In this part of the state the people are at present well informed concerning the San Jose scale, black knot, and peach yellows; therefore, most of the time of the local inspectors here is being spent in an educational campaign concerning the apple rust; teaching the people its life cycle; the part the cedar trees play in its development; its injury to both the apple tree and its fruit; how the disease spreads; and the best method of checking or preventing its ravages. The subject of apple rust is treated in another part of this bulletin by Mr. N. J. Giddings, Plant Pathologist of the West Virginia Agricultural Experiment Station. Mr. Giddings gives a plain statement of facts concerning the life history of this disease and the one sure way of preventing damage by it to the apple trees and apple crops in the red cedar belt.

Another plant disease which comes under the scope of the State Crop Pest Commission is also getting a foothold in the eastern part of the state, and is threatening the valuable chestnut timber with destruction. This new trouble is known as the chestnut bark disease, and within the last few years, has de-

stroyed practically all the chestnut trees in New Jersey, Delaware, southern New York, eastern part of Pennsylvania, in a large part of Maryland and northern Virginia. An article relating to the character of this disease and methods of control will be found elsewhere in this bulletin by Mr. A. B. Brooks, Forester to the State Crop Pest Commission.

Enforcement of the Crop Pest Law.

The State Crop Pest Law gives the Commission power to enter upon private or public premises and treat or destroy trees, shrubs, plants or vines that harbor dangerously injurious insects or plant diseases if the owners of such infested premises fail to do so after the property has been inspected by the State Entomologist, his assistant or a local inspector, and legal notice has been sent to the owner to treat or destroy within a specified time. However, it is thought best, as already stated, to work for co-operation among the general farmers and fruit growers, and thereby reach the desired end peacefully and with the good will of the majority rather than to enforce the law at once, thus getting the enmity of many and stirring up contention between the parties where co-operation should prevail. After all the resources of a peaceable nature have been exhausted in trying to accomplish the object in view there will be plenty of opportunity to resort to the law.

How to Secure the Most Good Through Inspection Laws.

The inspection of orchards and other premises is but the first step in the work to be done by the Crop Pest Commission in its endeavors to assist the people of the state in their fight against dangerously injurious insects and plant diseases which attack the crops of the farmers and fruit growers. This work must be followed up by giving the people instruction concerning the most effective means of checking these troubles and showing them as far as possible how to apply the remedies and preventives for the different kinds of insects and diseases. In carrying out this phase of the work one often finds people of a negligent and forgetful disposition and the suggestions given by the inspectors are overlooked and therefore trees badly infested with insects or diseases are allowed to remain without being either treated or destroyed, to the menace of healthy orchards in the neighborhood. People of this character need to be often reminded of the duty they owe to themselves and their neighbors in order that the most possible good to the community can be accomplished.

Heretofore, owing largely to lack of funds, inspection work under the old San Jose scale law did not reach the desired end in some localities of the state, from the fact that the inspection was not followed up as it should have been. Under the new law the money furnished by the county courts for the inspection will enable the Commission to carry on the work to completion. This will be done by giving all the information and assistance possible concerning the treatment of insects and diseases, and by reminding negligent people of their duty in this matter. Where necessary, trees, vines, shrubs or plants that harbor dangerously injurious insects or plant diseases will be treated or destroyed by the Commission in accordance with the State Crop Pest Law.

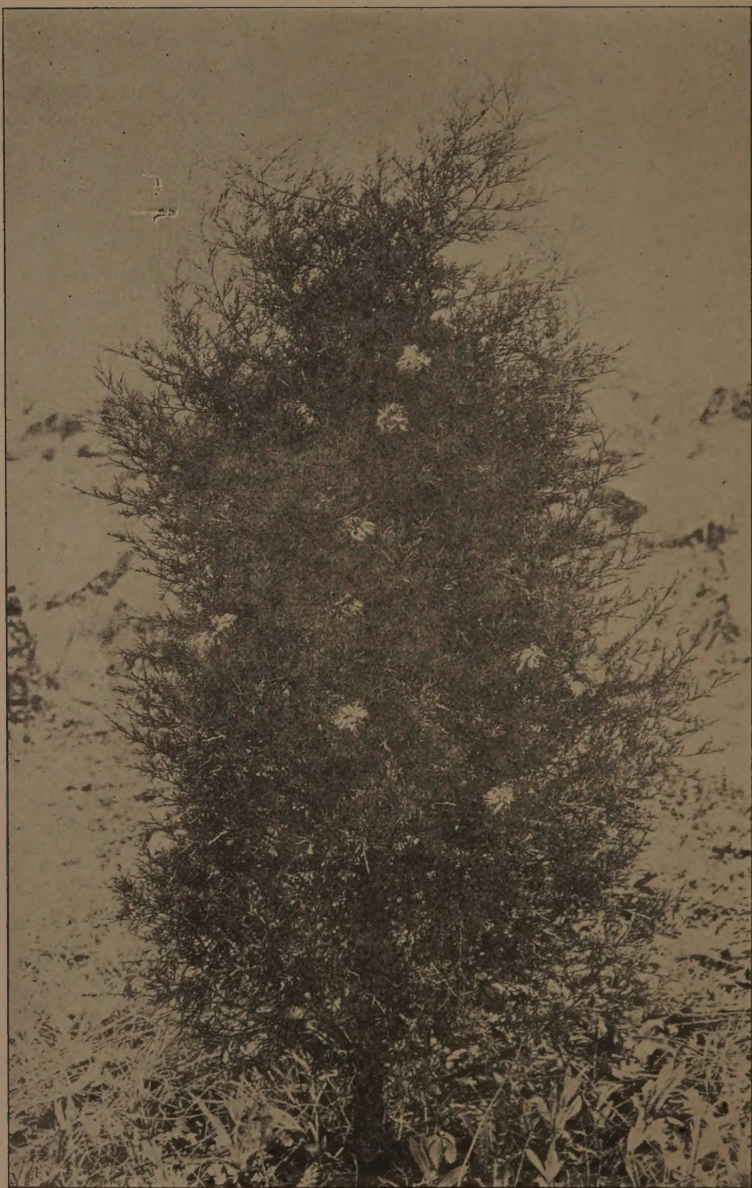
RUST OF APPLE.

By N. J. Giddings.

Introduction and History.

The rust of apple commonly spoken of as cedar rust has received a great deal of attention during the past three or four years. This is not surprising, in view of the fact that as a result of its ravages since 1909 the apple-growers of West Virginia have sustained losses which will easily amount to a million dollars. The injury resulting from infected fruit is quite serious, the small size and poor quality of fruit on badly infected trees make a great reduction in the amount of crop and its value, while another item of vast importance is the lowered vitality of trees which suffer from the disease. In sections where the rust is prevelant, some orchardists have been heard to remark that their York Imperial trees, which are especially susceptible to this disease, did not seem to do well at all, while some other varieties were thriving. It is hardly possible for the trees to do more than live over from year to year when most of the energy they should put into new growth and fruit production is absorbed by the fungus which produces rust on the leaves and fruit.

Every orchardist who has given this problem serious consideration must realize that cedar trees in the vicinity of apple orchards are directly responsible for the destructive outbreaks of apple rust. During 1888 the United States Department of Agriculture published a very complete article on this disease and the relationship existing between the rust of apple and the galls on cedar trees, commonly known as cedar apples. Some fifteen years ago one citizen of Martinsburg cut down some stately cedar trees in his front yard because he thought that they were injuring his apple orchard in some way. These instances are cited to show that apple rust has been known to both scientific men and to orchardists for a considerable number of years. It has sprung into greater prominence recently because weather conditions have been particularly favorable to its development, and because there have been great numbers of apple trees of susceptible varieties planted out in close proximity to cedar trees.



Cedar apples photographed just after a rain.

Life History of the Fungus and Relation of Cedar Trees to Rust in Apple Orchards.

The fungus which causes apple rust spends about seven eighths of its life cycle on the cedar tree and only about one eighth on the apple. The apple leaves usually become infected some time during May, and by late June the yellow spots on the leaves have become very noticeable. During July and August little tube-like growths are formed from the lower surface of these spots and spores are produced in them. These spores will immediately infect any red cedar trees to which they may be carried under favorable conditions. Visible evidence of this cedar infection is not to be seen until about June of the following year. At that time one may find the little brown or greenish galls, known as cedar apples, just beginning to swell on the twigs of the cedar. By late July or August they are quite noticeable, and in late autumn many small depressions may be seen on the larger cedar apples. It is from these little depressions that the gelatinous spore masses come out as spongy fingers on the cedar apples in the spring, and again spread the rust infection to the fruit and foliage of apple trees. Two years are required for the complete development of the fungus upon both cedar and apple, and about twenty-one months of that time is spent with the cedar as a host. In some instances the fungus even continues to live for another year on the cedar and produces spores for apple infection on two successive springs. From the above facts it will be easily seen that the cedar tree plays a most important part in the life history of the apple rust fungus. It should also be noted that the fungus has established itself so that the disease may cause serious injury to apples every season, if conditions are favorable. This possibility has been brought about by the fungus occasionally shedding spores from the cedar apples on two successive seasons.

The cedar trees are not the cause of the disease, but the fungus which produces it lives over from year to year on them. If a person harbors a criminal he is likely to get into trouble, even though he is unaware of the evil in his guest. The cedar trees provide shelter and food for the apple rust fungus at times when it can secure such things from no other source. Since the cedars are of practically no commercial value in West Virginia, and the apple orchards are a great source of income in many sections, it seems only reasonable that the former should be destroyed when they are harboring this destructive

disease within range of valuable orchard property. It has been demonstrated in West Virginia and in other states that removal of cedar trees in the vicinity of apple orchards puts an end to losses from the apple rust disease. A number of orchardists in Berkeley county who suffered heavily from the rust last year are reporting that the disease is of little importance in their orchards this season as they have cleaned up all or most of the cedar trees in their immediate vicinity. One man who has been greatly troubled by apple rust for a number of years, wrote to the Experiment Station stating that he had managed to get all the cedar trees near his orchard cut, except on one side and that the rust in his apple orchard was much worse on that side than anywhere else. Numerous examples of a similar character might be cited but it is better to see them than to hear about them. One other case which is well worthy of note is an orchard near Bunker Hill where the rust was very severe during 1912. There was a large cedar grove on one side of this orchard and a strong wind drove the rust spores into the apple trees so that the infection was more severe on the side next to the grove. The fruit on the badly infected side of those trees was little if any more than half as large as that on the other side, and as further proof of the weakening effect of the rust on the apple trees, it was noted this spring, (1913) that these trees had no bloom on the side next to the cedar grove, while there was abundant bloom on the other side.

Resistance of Varieties.

Some varieties of apple are far more susceptible to the rust than others. Among those which are most seriously affected, are the Rome Beauty, York Imperial, Smokehouse, and Rambo. The Ben Davis frequently shows a considerable amount of infection, but the actual injury does not seem to be so serious upon that variety. Grimes Golden, Northwestern Greening, Winesap, and Blacktwig, are quite resistant, though the rust may be found upon any of them. The commercial orchardist should not hesitate about planting susceptible varieties, if they are the ones best suited to his purpose, but he should look after the cedar trees and see that there are none left where they will cause serious infection.

Methods of Control.

Spraying is not a very effective remedy against the apple rust. Experiments along this line have been conducted at various times and in several states but the results have generally been unsatisfactory. The West Virginia Experiment Station

has conducted a very extensive series of tests, to determine the practicability of spraying to control this disease. The facts which are brought out by this work thus far are: First, that the disease may be controlled by thorough spraying at the proper time with any of the spray materials commonly used in orchard practice; second, that the time when effective spraying may be done is limited to two or three days, and that for complete protection the time of effective application is restricted to one or possibly two days; third, that a very complete knowledge of the habits of the fungus and of its relation to weather conditions is necessary in order to determine the proper time for spraying, with any degree of reliability; fourth, that one such special spray application may not be sufficient to control the disease, as there may be two or more periods of infection; and fifth, that the most severe infection usually takes place at or about blossoming time.

It would be very hard to find a commercial orcharist who would care to undertake a spraying program which presents so many difficulties, if there was any other way to handle the problem. There is another way in the case of the apple rust, and it is the destruction of the cedars—*all the cedars*—within a radius of about a mile of such orchards. This treatment will look like an endless task to some, but others have gone ahead and proven that it is both practical and economical, even where the cedar trees are quite numerous. There are, indeed many cases where the removal of scrubby cedars from land will add enough to its value, either as forest lot or as pasture, to more than pay for their removal.

Sometimes a man will say that there are no cedars near his orchard but that the trees are suffering from rust. Such a case has never yet been found to bear investigation. While there may be no large cedar trees near such an orchard, there are at least some small ones either near it or in it. Orchards have been examined, in Berkeley county which actually contained young cedar trees, although the cedars had been pretty well cleaned out around them. It is all right to get rid of the big trees first, but the little fellows must not be neglected, and it would be a much better plan to destroy them all at once. Some young trees will continue to come up from seed for a while, but they are easily handled, and will soon cease to be in evidence if a little care is taken to watch for them. The cedar is a tree which does not sprout up from the roots, so that there is no danger of reproduction by that method.

CHESTNUT BLIGHT AND ITS CONTROL IN WEST VIRGINIA.*

By A. B. Brooks.

Along with the recent vigorous cutting and destruction of our crop of timber in West Virginia there has been a corresponding increase in value of all forest products. In view of this fact, it has become the duty of the state to adopt vigorous



Fruiting bodies of chestnut bark disease fungus on body of chestnut tree.

measures for the protection of the remaining timber, not only from fires, but also from such losses as are suffered through the attack of insects and fungus diseases.

The Chestnut Blight Fungus.

Chestnut blight, one of the most serious fungus diseases that has appeared in the United States, attacks only the bark of chesnut and chinquapin, except in rare cases, the spores of the disease usually gaining entrance at some injured place on the trunk. Squirrels, as well as other animals, birds, and insects, are frequently responsible for the spread of the disease

*For additional information on chestnut blight see Bulletin No. 137, "The Chestnut Bark Disease" by N. J. Giddings, issued March, 1912, by the West Virginia Agricultural Experiment Station, Morgantown, West Virginia.

by injuring the tender bark of twigs and young trees and by carrying masses of spores from place to place. Trees of all ages are attacked by the blight and death results from the killing of the bark in the form of a girdle around the trunk or limb.

It is not difficult to recognize the blight when found on live trees. The yellow or reddish spots of fungus on the smooth bark of young trees are readily seen in winter and summer. On old trees with rough bark the fruiting bodies of the fungus appear between the ridges of bark. The leaves on branches or trees that have been killed during the spring or summer wither up and hang on for several months, thus furnishing a conspicuous guide to infections.

The disease made its appearance on Long Island, N. Y. about nine years ago, killing first the chestnut trees of the parks located in the region of New York City and afterwards spreading to distant points. At this date the disease is distributed as far as Vermont, western Pennsylvania, and North Carolina. In large sections of New York, Connecticut, Massachusetts, New Jersey, Delaware, Pennsylvania, and Maryland, the chestnut trees are practically all killed. Outside of these areas there are spot infections of various sizes.

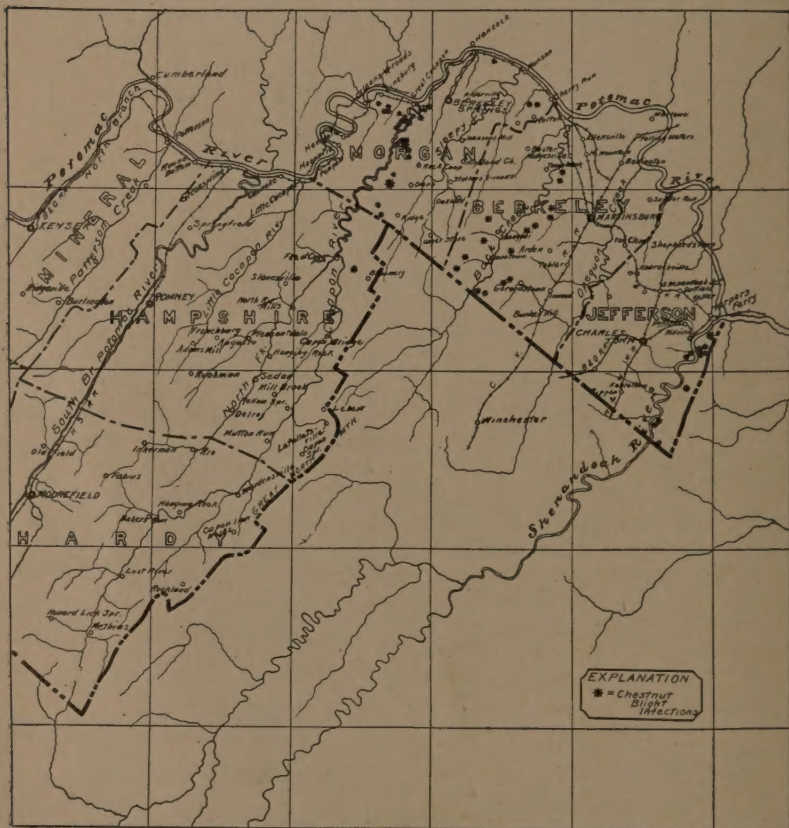
The sudden appearance of a new and extremely destructive disease is always a matter of great concern. This disease is of particular interest as there seems to be no record of its previous occurrence either in Europe or America. Some authorities have claimed that the fungus was imported from Europe and found our American conditions such that it developed as an active parasite upon the chestnut here. Others asserted that the fungus was a native species which had been existing previously as a harmless saprophyte, but, under favorable conditions, had suddenly become an active parasite. The problem appears to have been solved by officials of the United States Department of Agriculture who have recently discovered the same disease in China.* It appears to have been established there for many years but their chestnut trees seem to be resistant and it has not shown itself seriously destructive. Undoubtedly it was imported to this country from China.

Distribution in West Virginia.

Prior to October, 1912, chestnut blight had been reported from three localities in West Virginia, namely, White Sulphur Springs, Greenbrier county, Whetsell, Preston county, and Pickens, Randolph county. Diligent search has been made recently

*See article in "Science", August 29, 1913.

at the first two places named, but none of the disease has been found. This leads to the belief that the specimens picked up by a summer visitor at White Sulphur Springs and by a tourist at Whetsell were of a nearly related fungus. That reported from Pickens was found to have been introduced on ornamental



Map showing present distribution of the chestnut bark disease in West Virginia as far as known.

trees from a Philadelphia nursery. The small dying trees at this place were destroyed before the disease had opportunity to spread to the nearby native chestnut timber.

In the fall of 1912 two men were appointed agents of the Bureau of Plant Industry to investigate the distribution of chestnut blight in this state. A somewhat hurried search was first made in Jefferson county and about a dozen infections were

located, principally on the west face of the Blue Ridge Mountains. These infections are scattered at intervals from a point about three miles south of Harpers Ferry to the Clark county, Virginia, line and from the west bank of the Shenandoah river one mile above the town of Millville, W. Va., to the summit of the Blue Ridge. The number of diseased trees in these infections varies from one to over three hundred. The infections found in Berkeley county now number more than twenty. All are small, however, including from four to a dozen trees, and are distributed principally along Little North Mountain, and in the valley of Back creek. The greatest number and largest of the diseased areas are located in Morgan county. A few small and rather widely separated infections have been found in the northeastern portion of the county, not far from the Potomac river, but the most serious ones are on the west slope of Great Cacapon Mountain, where more than five hundred trees in each of two infections are found to be dying. Besides these a number of smaller ones are found at intervals from near Great Cacapon Station to the Hampshire county line. Westward from here the disease has spread to a point near Orleans Roads on the B. & O. railroad, and at intermediate points several small spots have been located. The blight has recently been observed also in northeastern Hampshire county, whence it has doubtless spread from the larger infections on the north.

Without doubt several small spots of blight occur now outside of the areas mentioned above. The regions where chestnut timber grows, however, has been examined—though often in haste—along the northern border of the state from Monongalia county to Jefferson county, and it is reasonably certain that no large infections, at least, occur outside of the three or four easternmost counties.

Of the sections not yet diseased it is probable that parts of Preston county are in greatest danger on account of a nearby large infected area in Somerset county, Pennsylvania.

Control of Blight.

Experiments to determine methods for the control of chestnut blight conducted by experts of the U. S. Department of Agriculture and of the Pennsylvania Chestnut Blight Commission have been so extensive and thorough that those now in charge of the eradication of this disease need not consume time and money in making further tests. In cases where the blight has attacked valuable ornamental or shade trees it may be possible to save them by careful tree surgery, and subsequent infections may be prevented by spraying with bordeaux mixture.

The diseased trees that stand in the forest, however, must be cut down and their diseased parts burned. The process of eradication in this way is as follows: The bark on the trunk is first peeled to the surface of the ground from a point above where the tree is to be cut. The tree is then felled and if worthless is cut in pieces of a size that can be handled and burned, the greatest care being taken to gather up every fragment that contains the fungus. If the trunk is valuable it is peeled and only the bark is burned, with such parts as are diseased. The trunk thus treated is as valuable as that of any other chestnut tree provided it has not been dead too long. Sprouts that come up around stumps where blighted trees have been cut often become infected from diseased portions of bark left on roots near the surface of the ground unless the stumps are thoroughly burned or painted with creosote. The trunks or bark of the blighted trees may be piled on their stumps and burned, but the burning must be thorough if effective. It has been found more economical to use creosote in most cases.

It is proposed to proceed along the following lines in the eradication of chestnut blight in West Virginia: The infections that have already been located will be visited, and an experienced cutter employed by the State Crop Pest Commission will assist the owners in destroying their diseased trees, or such parts as are affected, according to the method outlined above. In advance of this work a number of scouts employed by the Federal government and by the State Commissioner of Agriculture in collecting statistics relative to the distribution of the blight, will search for new infections. Every reasonable means will be employed for securing the co-operation of owners in destroying the blight, but in cases of failure to secure this, the trees will be cut according to the provisions of the recently enacted Crop Pest Law.

The diseased areas in Berkeley and Morgan counties are considered most dangerous because they lie closest to the valuable chestnut timber sections of the state, and for this reason will be looked after first.

It may be stated that there is reasonable hope for success in destroying the chestnut blight and keeping it permanently out of the state, provided the owners are willing to do their just part, and provided the state legislature at its next session appropriates funds for carrying on to completion the work that is now made possible through funds supplied by the federal government and through the limited funds available from the treasury of the state.